

# Karthik Pullalarevu

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## EDUCATION

### Vellore Institute of Technology

Bachelors in Computer Science & Electronics – CGPA 9.17/10

Coursework: Machine Learning, Data Structures and Algorithms, Micro-controllers

### Sri Sathya Sai Higher Secondary School

12th CBSE – 90.8%

Chennai, India

July 2018 – Apr 2022

Puttaparthi, India

Apr 2016 – Apr 2018

## EXPERIENCE

### Senior Machine Learning Engineer (MLE 2)

HyperVerge Inc

Bangalore, India

Jan 2022 – Present

- Leading a team of two in research efforts for face-antispoofing product across India, APAC & Africa, which contributes to **30% of the company's revenue**.
- Developed computer vision models for image-based presentation attack detection and deepfake detection, achieving **0.15% FAR & 0.06% FRR**, processing over **16mn+ requests monthly** in production and securing ISO 30107-1/30107-3 Level 2 compliance.
- Fine-tuned **multi-modal transformer architectures** and performed experiments in lines of distance based metrics and modalities like depth and videos.
- Applied quantization techniques like knowledge distillation and pruning, reducing model size from **335MB to 28MB** for on-device deployment, resulting in a 60% reduction in inference time on CPU from **305ms to 115ms**.
- Mitigated a serious security vulnerability** related to image injection on mobile devices by implementing an **anomaly detection** model using ANNs and mobile sensor readings, reducing deepfake injections from 200 per week to 0 within a month.
- Led team recruitment by developing an LLM-based resume parser, conducting candidate interviews, and mentoring two interns during their tenure.

### MITACS Research Intern (ETS Montreal)

Guide- Dr. Hervé Lombaert

Remote

Aug. 2021 – Dec 2021

- Worked on shape analysis of complex brain surfaces by using Graph CNNs and spectral filters for **brain parcellation classification**.
- Developed an efficient Python pipeline for spectral alignment of brain mesh surfaces. [\[code\]](#) [\[certificate\]](#) [\[presentation\]](#)

### Research Intern

Agency for Science, Technology & Research

Remote

June 2021 – Nov 2021

- Conducted research on **federated learning for medical data** to enhance data privacy while maintaining efficiency and accuracy, under the mentorship of Dr. Renuga Kanagavelu.
- Developed a federated learning simulation with two clients for segmentation of live tumors using **Flower platform**, achieving a **0.793 Dice score**.

### Machine Learning Intern

TCS Research & Innovation

Noida, India

May 2021 – Aug 2021

- Worked on semantic segmentation of hepatic vessels to diagnose portal hypertension.
- Trained **2D,3D U-Net models** along with preprocessing techniques like contrast enhancement and windowing, achieving 0.53 Dice score on 3DIRCADB dataset. **Tech stack : Pytorch, Image Processing, Slicer 3D**

## TECHNICAL SKILLS

**Programming Languages:** Python, C, C++, R, MATLAB

**Tools & Frameworks:** PyTorch, PyTorch Lightning, Keras, NumPy, FastAI, Pandas, Git, AWS, Docker, Hugging Face, LangChain, OpenAI, FastAPI, ITK Snap, Slicer 3D, Label Studio

## PUBLICATIONS & PATENTS

- Method And System For Determining Liveness of a Subject. (Non-Provisional Stage - USPTO)
- Method And System of Video Processing For Determining Liveness of a Subject. (Non-Provisional Stage - USPTO)
- Method And System of Image Processing For Determining Liveness of a Subject. (Non-Provisional Stage - USPTO)
- Semantic Segmentation for Plant Phenotyping using Advanced Deep Learning Pipelines. (accepted at Multimedia Tools and Applications) DOI: 10.1007/s11042-021-11770-7
- Robust Deep learning Model for Detection of Tomato Bacterial Spot on Novel Dataset; Submitted to Scientific Reports

## RESEARCH PROJECTS

### Quantification of COVID-19 chest CT scans - Mayo Clinic | Python, Pytorch

- Extracted tracheal regions from 600+ COVID-19 patient CT volumes using the airway extractor module in Slicer 3D software. Applied feature engineering techniques (Lasso, Boruta) and trained models (logistic regression, SVM, decision trees) to quantify tracheal infection. (Guide: Dr. Rajagopalan Srinivasan)

### COVID-19 Chest CT Segmentation | Python, Pytorch, Self-Attention, U-Net

- Worked on attention mechanisms for semantic segmentation of COVID infected chest slices, trained U-Net architecture to achieve 97.3% accuracy. (Guide: Dr. Kumar T. Rajamani)